

Keeping an eye on the big picture: Mayo Clinic's integrated supply chain management

ABSTRACT

The U.S. supply chain has advanced in other industries (retail, grocery, general merchandise), but the healthcare industry as a whole is just now learning the benefits of electronic commerce, vendor-managed inventory (consignment), evaluated receipts settlement, and just-in-time replenishment. Some suggest the primary reason we struggle in healthcare is due to the lack of a solid, underlying infrastructure, one that facilitates the integration of the supply chain with clinical systems through interfaces and data standards. For one Integrated Delivery Network (IDN), Mayo Clinic, integration is beginning to show the promised benefits and allowing the industry to finally see the big picture – the role data standards play in improving supply chain performance.



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Here a system, there a system: piecing it all together

Mayo Clinic has in place many systems and processes that help its healthcare professionals understand, manage and track the movement of medical products throughout its facilities. Mayo has an Electronic Medical Record system and to support our business functions, such as human resources, accounting and supply chain management, we use an Enterprise Resource Planning (ERP) system. Mayo has also developed its own software to manage supplies at the point of patient care that we call SIMS (Surgery Information Management System, although use is beyond surgeries).

The ERP system contains the source data for suppliers, products and pricing for the entire enterprise. SIMS contains an item master file for point-of-care sites within our hospitals, including the operating room (OR), Catheter Lab, Interventional Radiology (IR) and Gastroenterology (GI). These SIMS files are synchronized with our ERP system, mainly using the product item number stored in the materials management module. Integration between SIMS and the ERP has been built (both process and automation) over the past 10 years. Our integration with the revenue cycle (billing) has evolved similarly and it, too, utilizes the ERP Item number in the Charge Master.

As we work diligently to cut costs while delivering high quality patient care, a focus area for us has been the OR. We use an automated physician preference card system, which helps to automate the functions of the OR. Preference cards make it easier for nurses to provide the correct supplies and equipment for each surgery, reducing the number of supplies opened unnecessarily. Preference cards also help in streamlining the billing process,

limiting mistakes and making the entire process more efficient. With our SIMS system, we scan and document exceptions that are not on the preference card or items that require serial tracking. The goal is to make everything as simple as possible for those doing the scanning, in most cases our nurses. All items arrive in the OR (from our centralized OR Inventory Core) with a barcode for scanning. For supplies, approximately 30% of barcodes need to be created "in house" and 70% can be scanned exactly as they arrive from the vendor. We also use grocery style bar-coded catalogues for items that are not practical to barcode.

For implants, all items must have an internally generated barcode, because the vendors currently lack standardized barcodes which can be used for this purpose. The barcode for



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implants is generated internally by entering the serial number, lot number and expiration date. Consigned items and tissue are also stored in SIMS. The system has an indicator for consigned versus owned items which is reconciled monthly with the "official" consignment contracts.

Using our current system and processes, Mayo has been able to obtain accurate data on implant and supply use in the OR and other points of care. The data is then used to drive standardization and areas of possible expense reduction which ultimately leads to higher value for our patients.

Information drives value

By integrating our supply chain management systems and processes with other critical business and clinical functions within the hospital, we have come a long way in terms of driving efficiencies and gaining insight into our supply use. We are employing best practices to accomplish these goals, including:

Using very few non-contract items

Frequently used items, inventory and serially tracked items (implants) are all kept on the ERP Item Master file. Non-contract supplies can be procured by either adding the item to the file or ordering as a "special/non-file" item. Special/non-file items are managed very closely as are any non-contracted purchase. Data regarding the use of non-contract items is collated and reviewed by a centralized Value Analysis Team for Mayo's hospitals. When this centralized team sees a particular non-contract item ordered multiple times, they move forward in discussions with the hospital(s) that is ordering the non-contract item to better understand the item, and to evaluate whether the item should be placed on contract. The committee may also research whether there are already acceptable substitute products already under contract and used in other Mayo facilities. Mayo works very collaboratively as a team and we are data driven in our decision making (often using Six Sigma – DMAIC (Define, Measure, Analyze, Improve, Control)/Lean as our quality/efficiency framework). We also have been discussing alternative strategies pertaining to our Item Master Strategy that would further close gaps and enhance our processes (Called Category Management, used in the Retail Industry today) but are only at the beginning stages of scoping and designing.

Ensuring the accuracy of preference cards

With accurate preference cards, the correct items are pulled from inventory up-front, items are not wasted, and there is little rework on the part of those doing the stocking in returning items to the stock room. This level of preference card accuracy has been achieved through multiple avenues.

- There is a team leader for each service's preference cards at each hospital. OR nurses maintain electronic communication with the team leader, so that items which are incorrectly "on" or "not on" the preference card are easily communicated to the Team Leader for updating.

- As supplies are pulled for a given case, they are put into a "pending" mode electronically. The case cart goes into OR. As OR staff opens supplies they increment inventory if they are not going to use something and decrement inventory if they add something. All supplies decremented and incremented are done via barcode scanning. Both these tasks are completed before the items used during a surgical procedure are "finalized" and sent to the ERP central back office system. Once the supplies/implants used are finalized, the implant information is entered into the patient's electronic medical record as well.
- As the patient records are being finalized a small subgroup that reads surgeon dictations and checks dictations against supplies/implants entered into the electronic medical record as used. For example, if the dictation shows that hernia with mesh procedure was done, mesh shows up in the "used" supply/implant area.

Managing point-of-care restocking processes to allow for "right item, timely availability"

Restocking management is a process that eliminates overstocking and potential expiration of supplies. It requires buy-in on the part of the nurses for rigorous documentation of supplies, because if nurses do not scan added supplies, the computer system does not know the item needs to be re-ordered. The point of use SIMS system is a real-time system that feeds the central ERP system. The central ERP system is a batch system, which then replenishes supplies when items are noted to have dropped below a PAR level (the previously determined order point). Cycle counts are done regularly and back-orders are monitored and managed daily.

Collaborating with physicians to reduce one-shot, non-contract item ordering

With input from key Mayo physician groups, Mayo's Supply Chain Management and Clinical workgroups gather and collate data about contract/non-contract use of implants and supplies and report the findings back to physicians. This process allows the physicians to drive toward consolidation of use for both implants and supplies. Physicians are interested in providing high quality care for the best price for the patients and so engage in this work readily. Our Finance department also collates "cost per case" data and presents this to the physician groups as well.

Ensuring that rebates are captured

Mayo's contract management staff enters supply contracts into a centrally housed and managed database. Any contracts with rebate features are set up with a receivable based on the payment schedule and assumed amount (based on projections). The receivable is then managed closely like any other significant receivable. Disputes are handled through the contracting team if there are issues or delinquent payments.

Ensuring billing is accurate and complete.

Cost changes are electronically updated as received and authorized into the ERP central files at Mayo. We closely manage



pricing, and only accept the price if it is within our terms and conditions (we hold pricing firm for the term or allow for updates on a defined calendar). SIMS as well as our Billing System is fed any applicable updates and accepted "as is" from the ERP. The only thing the barcode is used for is to identify the item. The rest of the information about that item is kept in the item master file. The ERP 3-way (purchase order, receipt and invoice) match ensures payment accuracy. The ERP can handle site specific prices for the same item (although our goal is to have one price for the enterprise).

Support of suppliers paramount

Like other hospitals in the U.S., Mayo uses thousands of supplies from thousands of manufacturer partners. While many of the supplies come through a distributor many also come through direct relationships with the manufacturer. As we strive for ultimate efficiency in our supply chain, we recognize that the journey is more of a marathon than a sprint, and as such, we need the complete support and partnership of our vendors. Key developments in these relationships include:

Vendor control

To manage which vendor may be permitted in a surgical suite, we are using a vendor registration system. All vendors must go through the OR nurse manager before they are allowed in the surgical suite. The vendor and surgeon use products that are identified on the surgeon case request before surgery. If the surgeon wants to use a new product, the surgeon formally requests the "new" item through the OR Manager. Compliance is managed through reporting and basic compliance management protocol.

Data standards

Mayo Clinic is on the Leadership Team of GS1 Healthcare US to assist the healthcare industry in standardizing our numbering system with the GS1 System of standards. We are working with the U.S. Food and Drug Administration and GS1 US to move

initiatives forward. While suppliers are not denied access to Mayo if they are not GS1 standards compliant, we are requesting that our supplier partners convert their ascribed account numbers and product descriptions to the GS1 GTIN and GLN standards consistent with 2010 GLN Sunrise and 2012 GTIN Sunrise dates. Mayo Clinic considers our suppliers as partners and we work collaboratively with them. However, at some point in the future we may need to take stronger actions due to either regulation, safety or cost concerns (or all three).

Mayo Clinic is asking suppliers to standardize first for locations (GLN) (see Mayo Clinic/Cardinal Health case study summary in this article). Under this system Mayo will do all contracting and purchasing through the standard facility identifiers (one set of identifiers at the Mayo Ship to level) as opposed to each supplier providing account numbers representing the supplier's unique view of Mayo locations. Later, we will ask vendors to standardize by having a unique product identifier for each product, using the GTIN, as well as contributing product data to a common registry in a shared data utility via the GDSN (see Figure 1).

Figure 1: **GS1 standards included in the U.S. Healthcare Industry Sunrise Dates**

The foundational standards of the GS1 System:

Global Trade Item Number® (GTIN)® – a 14-digit code assigned to each individual manufactured product as well as to each different packaging configuration

Global Location Number (GLN) – a 13-digit code used to uniquely identify healthcare supplier and provider locations

Global Data Synchronization Network® (GDSN®) – a network of certified data pools enabling the standardization and synchronization of supply chain product data between trading partners

Conclusion: benefits come into view

Open communication lines, both internally and externally, have helped to ensure smooth integration of our systems and processes along our 10-year journey. Mayo has participated in industry initiatives to better educate ourselves and to share our insights with others. We've recruited partners that share our vision of a better way of doing things, and we have selected suppliers who have a proven track record working with us collaboratively. Executive leadership is also important in terms of prioritizing the multiple and sometimes competing healthcare IT initiatives and providing resources and support across supply chain management at Mayo.

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Based on our experiences to date we are confident the rewards of standards adoption and complete supply chain management systems integration will be realized industry wide. Organizations that go through this process will learn the skills needed to excel in the healthcare industry of the future, including unprecedented collaboration, systems thinking utilization of high quality information, innovation, improvement and change management. Keeping an eye on this big picture can serve as a powerful motivator to get through implementation challenges.

Mayo Clinic has automated much of the Supply Chain and the results are unquestionable. Over the past 10 years, our IDN has achieved documented Supply Chain savings approaching half a billion dollars all while reducing staffing levels and achieving charge capture improvements. What is really exciting is what is to come. The systems are not fully developed, processes have not been fully optimized and implementation of data standards has just begun. The next 10 years represent a huge opportunity as opposed to a healthcare crisis. Mayo Clinic remains steadfast in its commitment to their patients where "the needs of the patient always come first".

About Mayo

Mayo Clinic is a not-for-profit medical practice dedicated to the diagnosis and treatment of virtually every type of complex illness. The needs of the patient come first. A patient will see as many doctors, specialists and other health care professionals as needed to provide comprehensive diagnosis, understandable answers and effective treatment.

ABOUT THE AUTHOR

Joe Dudas is Director of Accounting and Supply Chain Informatics at the Mayo Clinic, where he is responsible for implementing and optimizing technology and business best practices. He leads forums across Mayo organizations to drive strategic supply chain, accounting and research IT direction, standardization and best practices.

Mr. Dudas is currently a member of the GS1 Healthcare US leadership team. He participates in many other industry efforts to improve the healthcare supply chain. Mr. Dudas brings more than 20 years of information systems experience in IT outsourcing, telecommunications, retail and healthcare.

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Mayo Clinic and Cardinal Health partner to implement GLNs for patient safety and supply chain efficiency

In the past there have been numerous discussions about the value of standards, and which standards to use in the healthcare industry. Today, the discussion has shifted to how to implement standards, the first steps to take, and timing.

Many of the healthcare industry's supply chain partners, including Mayo Clinic, have voluntarily established the end of 2010 as the date by which they will adopt GS1 GLNs to replace custom account numbers in order to reduce costs and improve patient safety. Mayo Clinic firmly believes that supply chain data standards will greatly improve healthcare safety and efficiency, supporting their primary value that "the needs of patients come first."

In July 2008, Mayo Clinic and Cardinal Health collaborated to implement the GS1 GLN as their sole account/location identifier. Both organizations agreed that this GLN project would be an innovative first step toward the 2010 GLN Sunrise.

Implementation results

Mayo Clinic and Cardinal Health are among the first organizations in U.S. healthcare to implement GLNs in supply chain transactions. The results were as follows:

- Mayo Clinic converted 58 custom account numbers to GLNs.
- Mayo Clinic was able to convert approximately 60,000 order lines to the GLN in November 2009 – which accounted for 85% of total EDI orders.
- \$8 million of product was transacted with Cardinal Health using the GLN in November 2009, and over \$70M of product was purchased with the GLN over the course of the 2009 year as a result of this implementation.

Implementation benefits

Price accuracy improves with location identification accuracy. Location identification errors can cause loss of discount eligibility as well as tier qualification and rebate disputes. Price accuracy for Mayo Clinic and Cardinal Health is currently 99.5%, whereas the average supplier accuracy is 95%. Superior price accuracy is attributed to not only GLN, but also to the commitment that both organizations make to price integrity and associated improvement efforts.

The use of GLNs improves supply chain management performance, and GLNs used in conjunction with other GS1 standards promise even greater performance. Similarly, the more supply chain partners that adopt GS1 standards, the greater the benefits for the entire industry.

Visit www.gs1us.org/healthcare to read the full case study.